

1 What is claimed is:

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3 1. A method of broadcasting from a proximal cache at a proximal
4 internet protocol address (IPA) a routing item for indicating an
5 originator storing web content data associated with a uniform
6 resource locator (URL) of a web server permanently storing the web
7 content data, the method comprising the steps of,

8 originating URL identifier generating an originating URL
9 identifier for indicating the URL,

10 originating IPA generating an originating IPA for indicating
11 the originator,

12 destination IPA generating a destination IPA for indicating a
13 destination cache,

14 associating the originating IPA and the originating URL as the
15 routing item, and

16 transmitting the routing item from the proximal cache at the
17 proximal IPA to the destination cache at a destination IPA.
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20 2. The method of claim 1 further comprising the steps of,

21 distance generating a distance metrics for indicating a web
22 hop distance of a number of the plurality of cooperative web caches
23 through which the URL web content data would be communicated from
24 the from the originator through the plurality of cooperative web
25 caches to the proximal web cache.
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1 3. The method of claim 2 wherein,

2 the originating URL identifier is a proximal URL identifier,
3 the originating IPA is the proximal IPA,
4 the proximal cache stores locally the web content data, and
5 the metric distance is one indicating that one web hop is
6 between the destination cache to the proximal cache.

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8 4. The method of claim 2 wherein,

9 the originating URL identifier is a source URL identifier,
10 the originating IPA is the source IPA indicating an IPA
11 location of a source distally storing the web content data,
12 the metric distance is greater than one indicating a number
13 greater than one of the number of web hops between the destination
14 cache through the proximal cache to the source distally storing the
15 web content data.

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18 5. The method of claim 4 wherein,

19 the source is a distal web cache distally storing the web
20 content data, and

21 the source IPA is a distal web cache IPA.

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24 6. The method of claim 4 wherein,

25 the source is the web server distally permanently storing the
26 web content data, and

27 the source IPA is a web server IPA indicating the IPA location
28 of the web server.

1 7. The method of claim 1 wherein,

2 the originating URL identifier is selected from the group
3 consisting of,

4 an exact URL identifier being an exact URL comprising a
5 plurality of URL components,

6 a wildcard URL identifier being a wildcard URL comprising a
7 plurality of URL components a last URL component of which being a
8 wildcard component, and

9 a coded URL identifier being a coded URL comprising a series
10 of hashing codes of a decomposed URL being a decomposition of the
11 URL selected from the group consisting of either an exact URL or a
12 wildcard URL each of which comprising a series of URL components,
13 the series of hashing codes being a sequence of hashing codes of
14 respective URL segments of a respective series of increasingly
15 concatenated URL components of the series of URL components of the
16 URL.

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1 8. A method of broadcasting from a proximal cache at a proximal
2 internet protocol address (IPA) a routing item for indicating a
3 distal web cache storing web content data associated with a uniform
4 resource locator (URL) of a web server permanently storing the web
5 content data, the proximal web cache is a first one of a plurality
6 of cooperative web caches, the distal web caches is a last one of
7 the plurality of cooperative web caches, the method comprising the
8 steps of,

9 URL identifier generating a URL identifier for indicating the
10 web content data of the URL stored in the distal web cache,

11 proximal IPA generating the proximal IPA for indicating the
12 location of the proximal cache,

13 destination IPA generating a destination IPA for indicating a
14 destination cache,

15 distance generating a distance metric for indicating a web hop
16 distance of any number of the plurality of cooperative web caches
17 through which the web content data would be communicated from the
18 distal web cache to the destination web cache,

19 associating the proximal IPA and the URL identifier and the
20 distance metric as the routing item, and

21 transmitting the routing item from the proximal cache at the
22 proximal IPA to the destination cache at a destination IPA.

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24 9. The method of claim 8 wherein,

25 the distance metric is greater than one indicating a number
26 greater than one of the number of web hops between the destination
27 cache through the proximal cache to the distal web cache storing
28 the web content data.

1 10. The method of claim 8 wherein,

2 the URL identifier is selected from the group consisting of,
3 an exact URL identifier being an exact URL comprising a
4 plurality of URL components,

5 a wildcard URL identifier being a wildcard URL comprising a
6 plurality of URL components a last URL component of which being a
7 wildcard component, and

8 a coded URL identifier being a coded URL comprising a series
9 of hashing codes of a decomposed URL being a decomposition of the
10 URL selected from the group consisting of either an exact URL or a
11 wildcard URL each of which comprising a series of URL components,
12 the series of hashing codes being a sequence of hashing codes of
13 respective URL segments of a respective series of increasingly
14 concatenated URL components of the series of URL components of the
15 URL.

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19 11. The method of claim 8 further comprising the steps of,

20 repeating the URL identifier generating step, proximal IPA
21 generating step, distance generating step, the associating step, a
22 plurality of times for generating a plurality of routing items each
23 comprising a URL identifier and a respective distance metric, and

24 incorporating the plurality of routing items within a protocol
25 data structure within the routing packet prior to the transmitting
26 step, the routing protocol packet comprising the URL and a
27 respective distance metrics and comprising the proximal IPA and the
28 destination IPA.

1 12. A method of broadcasting from a proximal cache at a proximal
2 internet protocol address (IPA) a routing item for indicating a
3 distal web cache storing web content data associated with a uniform
4 resource locator (URL) of a web server permanently storing the web
5 content data, the proximal web cache is a first one of a plurality
6 of cooperative web caches, the distal web caches is a last one of
7 the plurality of cooperative web caches, the method comprising the
8 steps of,

9 storing in a routing table a plurality of URL identifiers
10 cross referenced a respective plurality of distance metrics,

11 URL identifier generating a URL identifier of the plurality of
12 URL identifiers, the URL identifier for indicating the web content
13 data of the URL stored in the distal web cache,

14 proximal IPA generating the proximal IPA for indicating the
15 location of the proximal cache,

16 destination IPA generating a destination IPA for indicating a
17 destination cache,

18 distance generating a distance metrics by cross referencing
19 the URL identifier to one of the plurality of URL identifiers and
20 to a respective one of the plurality of distance metrics for
21 indicating a web hop distance of any number of the plurality of
22 cooperative web caches through which the web content data would be
23 communicated from the distal web cache to the destination web
24 cache,

25 associating the proximal IPA and the URL and the distance
26 metrics as the routing item, and
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transmitting the routing item in a routing packet within a routing protocol from the proximal cache at the proximal IPA to the destination cache at a destination IPA.

13. The method of claim 12 wherein,

the originating URL identifier is selected from the group consisting of,

an exact URL identifier being an exact URL comprising a plurality of URL components,

a wildcard URL identifier being a wildcard URL comprising a plurality of URL component a last URL component of which being a wildcard component, and

a coded URL identifier being a coded URL comprising a series of hashing codes of a decomposed URL being a decomposition of the URL selected from the group consisting of either an exact URL or a wildcard URL each of which comprising a series of URL components, the series of hashing codes being a sequence of hashing codes of respective hashing of URL segments of a respective series of increasingly concatenated URL components or the series of URL components of the URL.

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1 14. The method of claim 12 further comprising the steps of,
2 repeating the URL identifier generating step, proximal IPA
3 generating step, distance generating step, the associating step, a
4 plurality of times for generating a plurality of routing items each
5 comprising a URL identifier and a respective distance metric, and
6 incorporating the plurality of routing items within a protocol
7 data structure within the routing packet prior to the transmitting
8 step, the routing protocol packet comprising the URL and a
9 respective distance metrics and comprising the proximal IPA and the
10 destination IPA.

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12 15. The method of claim 12 wherein,
13 the storing steps creates a routing table for cross referencing
14 the plurality of URL identifiers to the plurality of distance
15 metrics and to one or more juxtaposed cooperative web caches IPAs
16 of one or more juxtaposed cooperative web caches of the cooperative
17 web caches, the one or more juxtaposed cooperative web caches for
18 routing URL identifiers to distal web caches storing the web
19 content data of the respective plurality of URL identifiers.

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22 16. The method of claim 15 wherein the proximal cache and the one
23 or more juxtaposed cooperative web caches being within a local
24 group of cooperative web caches.

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27 17. The method of claim 16 wherein the proximal cache is within one
28 or more local groups of cooperative web caches.